

METHOD AND ARRANGEMENT FOR THE PRODUCTION OF LIGNOCELLULOSE-CONTAINING BOARDS

5 The present invention relates to a method of producing continuously lignocellulose-containing boards in accordance with the preamble of claim 1, and to an arrangement for carrying out the method in accordance with the preamble of claim 5.

10 Methods of producing lignocellulose-containing board are well known to the art and have found wide use in practice. The manufacture of such boards includes the following main method steps: disintegration of the raw material into particles and/or fibres of appropriate size, drying the particles and/or fibres to a determined moisture quotient and glue-coating the material either prior to or subsequent to said drying process, shaping the glue-coated material to form a mat, which may comprise several layers, and optionally cold pre-pressing the mat, pre-
15 heating said mat, water-spraying mat surfaces, etc., and heat pressing the mat in a discontinuous press or in a continuous press while subjecting the material simultaneously to pressure and heat so as to obtain a finished board. It is difficult to control the quality of the boards produced in accordance with this known method with respect to the moisture content, temperature and dimensional stability of the
20 boards. When the boards leave the heat pressing in the production process, they have a temperature in excess of 100°C and a corresponding vapour pressure. The temperature of the board surfaces falls rapidly to beneath 100°C as the enclosed moisture is vaporised by virtue of a so-called flash effect. The boards are then cooled in so-called cooling wheels. As a result, the boards will obtain a
25 moisture content of about 6-7% after intermediate storage of the board over a day or two. In many applications this creates a problem in environments that have a higher average relative humidity, since the boards will take up moisture when used and therewith undergo dimensional changes, as in the case of all lignocellulose-containing materials. One way of counteracting this is to spray water on the
30 boards as they leave the press.

Another known phenomena is that boards produced in this way obtain mutually different moisture contents in the surface layers relative to the core layer.

If the boards are used for some type of surface treatment for instance, such as lamination, without having earlier equalised the difference in moisture content, the dimensions of the board may change when this equalisation takes place in time so that the surface layer loosens. In order to achieve desired equalisation between the various layers, it is customary to store the boards for a number of weeks.

Another known problem is that the boards are not dimensionally stable when they leave the press. This is noticeable primarily because the boards shrink or swell over a process that can take one or more days. Consequently, calibration grinding of the boards is not normally undertaken until the boards have been stored in intermediate storage locations over a number of days.

Another known problem is that the boards are too hot to be stacked and stored when leaving the hot press. If the boards are too hot when stacked, the glue joints may begin to break down and the boards consequently weakened. This problem is normally alleviated by keeping the boards in a so-called cooling wheel in which the board temperature is lowered by natural convection.

It will be evident from the foregoing that the conventionally used press technique and board production technique involve a number of cost-inducing handling stages and intermediate storage subsequent to the actual board manufacturing process. Accordingly, the object of the present invention is to stabilise a board with respect to its moisture content, temperature and dimensional stability in a continuous process, and therewith avoid cost-inducing handling and storage of the board. Because dimensional stability is achieved, the boards may also be ground or sanded down to a final thickness directly after manufacture. This object is achieved with the method and the apparatus defined in the characterizing clauses of respective claims.

The invention will now be described in more detail with reference to the accompanying drawing, which is a schematic longitudinal section view of plant constructed in accordance with the invention.

The plant illustrated in the drawing is based on the plant disclosed in SE 504 638, which describes a continuous steam injection process. A mat 1 formed from lignocellulose-containing material is fed into a continuous steam injection press 2 and there pressed into boards 3. The boards exiting from the continuous

steam injection press 2 enter an after-conditioning zone 4. In the illustrated example, the zone 4 includes two after-conditioning units 5 and 6. The boards can be transferred directly to a grinder 7 from the after-conditioning zone 4, for grinding of the board to a final thickness.

5 In accordance with the invention, each after-conditioning unit 5, 6 comprises an air supply unit 8 that includes a suction fan 9 and a heater 10. A steam or water supply device 11 may also be provided for moistening the air. The air is sucked into the two air supply units at 12. As will be seen from the drawing, the air is delivered from above in the case of the after-conditioning unit 5, and from beneath in the case of the after-conditioning unit 6.

10 Thus, as the boards exit from the continuous steam injection press 2 they pass into the after-conditioning zone 4 in which air is sucked through the boards with the aid of negative pressure in an amount determined in relation to board production and at a specific moisture content and temperature. In the first after-conditioning unit 5, the air is sucked down through the board, whereas in the after-conditioning unit 6 the air is sucked through the board in the opposite direction, i.e. upwards. However, this double air flow in mutually opposite directions is not necessary in order to achieve an effect since in certain cases the throughflow of air in only one direction will suffice, meaning that only one after-conditioning unit 15 will be required.

20 It can be mentioned by way of example that a board having a density of 600 kg/m^3 and a thickness of 16.6 mm is cooled from 100 to 60°C in 60 seconds when applying a subpressure of 15 kPa. By way of another example, it can be mentioned that a board having a density of 600 kg/m^3 and a thickness of 32 mm is correspondingly cooled in 80 seconds.

25 It will also be noted that board having a thickness of 10 mm and a density of 650 kg/m^3 and produced in accordance with the invention in a pilot plant obtained a stable thickness after having passed through the after-conditioning zone. Measurements made one or more days after manufacture showed that boards 30 which had passed through the after-conditioning zone retained their thickness, whereas boards that had not passed through said zone were often liable to shrink

up to 1 mm within a day or two, in the same way as conventionally manufactured board shrinks.

- Conventionally produced boards have an enhanced density at their surfaces. However, because it is possible to produce in the steam injection press
- 5 boards that do not have an enhanced surface density, the air throughflow and therewith conditioning of the board and lowering of its temperature can be effected more quickly than in the case of conventional board handling techniques.
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